

1. (currently amended) An ultrasonic diagnostic imaging system for three dimensional scanning comprising:

~~an~~ a two dimensional array transducer having a plurality of transducer elements;

a beamformer coupled to the array transducer which causes the transducer to scan a volumetric region with a plurality of transmit beams and to receive echo information in response to transmit beams, the beamformer controlling the point spread functions of beams transmitted and/or received by the beamformer in the azimuth and elevation dimensions;

an image processor coupled to the beamformer which produces image signals in response to the echo information; and

a display coupled to the image processor,

wherein beams produced by the beamformer exhibit a first point spread function when the volumetric region is scanned with a first line density and a second point spread function when the volumetric region is scanned with a second line density.

2. (original) The ultrasonic diagnostic imaging system of Claim 1, wherein the point spread function comprises the two-way spatial response at a focal region of pulse-echo spatial sampling of the volumetric region.

3. (original) The ultrasonic diagnostic imaging system of Claim 1, wherein the transmit beams exhibit a relatively narrower beam profile at the focus when scanning the volumetric region with a first line density, and the transmit beams exhibit a relatively broader beam profile at the focus when scanning the volumetric region with a second line density which is less than the first line density.

4. (original) The ultrasonic diagnostic imaging system of Claim 3, wherein adjacent beams overlap at substantially the same intensity levels when scanning the volumetric region with the first and second line densities.

5. (original) The ultrasonic diagnostic imaging system of Claim 4, wherein the transmit beams satisfy the Nyquist criterion for spatial sampling of the volumetric region to substantially the same degree.

6. (original) The ultrasonic diagnostic imaging system of Claim 1, wherein the point spread functions satisfy the Nyquist criterion for spatial sampling of the volumetric region to substantially the same degree.

7. (currently amended) The ultrasonic diagnostic imaging system of Claim 1, wherein the beam point spread function exhibits both an azimuth dimension and an elevation dimension;

wherein point spread function is symmetrical in both the azimuth and elevation dimensions.

8. (currently amended) The ultrasonic diagnostic imaging system of Claim 1, wherein the beam point spread function exhibits both an azimuth dimension and an elevation dimension;

wherein point spread function is asymmetrical in the azimuth and elevation dimensions.

9. (currently amended) An ultrasonic diagnostic imaging system for three dimensional scanning comprising:

~~an~~ a two dimensional array transducer having a plurality of transducer elements;

a beamformer coupled to the array transducer which causes the transducer to scan a volumetric region with a plurality of transmit beams and to receive echo information in response to transmit beams, the beamformer controlling the point spread functions of beams transmitted and/or received by the beamformer in the azimuth dimension and the

elevation dimension by control of the aperture function of the array transducer;

an image processor coupled to the beamformer which produces image signals in response to the echo information; and

a display coupled to the image processor,

wherein the beamformer utilizes a first aperture function when the volumetric region is scanned with a first line density and a second aperture function when the volumetric region is scanned with a second line density.

10. (previously presented) The ultrasonic diagnostic imaging system of Claim 9, wherein the aperture function comprises the combination of the elements used in an active aperture of the array transducer and the apodization function of the elements of the active aperture.

11. (original) The ultrasonic diagnostic imaging system of Claim 10, wherein the apodization function is controlled to match the point spread function to the line spacing when scanning the volumetric region with the first and second line densities.

12. (original) The ultrasonic diagnostic imaging system of Claim 11, wherein the first line density is greater than the second line density; and  
wherein the apodization function is controlled to scan an increased depth-of-field when scanning the volumetric region with the second line density.

13. (original) The ultrasonic diagnostic imaging system of Claim 10, wherein the apodization function comprises the relative weighting of signals of the respective elements of the active aperture during a transmission or reception event.

14. (original) The ultrasonic diagnostic imaging system of Claim 9, wherein the first and second aperture functions satisfy the Nyquist criterion for spatial sampling of the volumetric region to substantially the same degree.

15. (original) The ultrasonic diagnostic imaging system of Claim 14, wherein the first and second aperture functions both substantially exactly satisfy the Nyquist criterion for spatial sampling of the volumetric region.

16. (original) The ultrasonic diagnostic imaging system of Claim 10, wherein the scanning beams exhibit a substantially constant angular sampling density; and wherein the apodization function is varied as a function of beam angle to compensate for transducer acceptance angle effects.

17. - 22. (canceled)